

10/698,118

(FILE 'HOME' ENTERED AT 16:48:56 ON 27 NOV 2004)

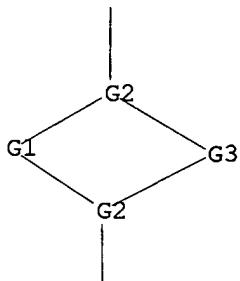
FILE 'REGISTRY' ENTERED AT 16:49:13 ON 27 NOV 2004

L1 STRUCTURE uploaded

=> d 11

L1 HAS NO ANSWERS

L1 STR



G1 Ag,Au,Cu

G2 O,S,Se,Te

G3 Al,Ga,In

Structure attributes must be viewed using STN Express query preparation.

=> s 11

SAMPLE SEARCH INITIATED 16:49:33 FILE 'REGISTRY'

SAMPLE SCREEN SEARCH COMPLETED - 55 TO ITERATE

100.0% PROCESSED 55 ITERATIONS  
SEARCH TIME: 00.00.01

1 ANSWERS

FULL FILE PROJECTIONS: ONLINE \*\*COMPLETE\*\*  
BATCH \*\*COMPLETE\*\*  
PROJECTED ITERATIONS: 656 TO 1544  
PROJECTED ANSWERS: 1 TO 80

L2 1 SEA SSS SAM L1

=> s 11 full  
FULL SEARCH INITIATED 16:49:38 FILE 'REGISTRY'  
FULL SCREEN SEARCH COMPLETED - 966 TO ITERATE

100.0% PROCESSED 966 ITERATIONS  
SEARCH TIME: 00.00.01

38 ANSWERS

L3 38 SEA SSS FUL L1

=> fil caplus  
COST IN U.S. DOLLARS SINCE FILE TOTAL  
FULL ESTIMATED COST ENTRY SESSION  
155.42 155.63

FILE 'CAPLUS' ENTERED AT 16:49:43 ON 27 NOV 2004

USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.

PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

COPYRIGHT (C) 2004 AMERICAN CHEMICAL SOCIETY (ACS)

Copyright of the articles to which records in this database refer is held by the publishers listed in the PUBLISHER (PB) field (available for records published or updated in Chemical Abstracts after December 26, 1996), unless otherwise indicated in the original publications. The CA Lexicon is the copyrighted intellectual property of the American Chemical Society and is provided to assist you in searching databases on STN. Any dissemination, distribution, copying, or storing of this information, without the prior written consent of CAS, is strictly prohibited.

FILE COVERS 1907 - 27 Nov 2004 VOL 141 ISS 23  
FILE LAST UPDATED: 26 Nov 2004 (20041126/ED)

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> s 13  
L4 28 L3

=> d 1-28 bib abs

L4 ANSWER 1 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2004:343960 CAPLUS  
DN 141:306353  
TI Synthesis and characterization of CuInS<sub>2</sub> single source precursors for chemical vapor deposition  
AU Cowen, J. E.; Riga, A. T.; Hepp, A. F.; Duraj, S. A.; Banger, K.; McClarnon, R.  
CS Cleveland State University, Cleveland, OH, 44115, USA  
SO Journal of Thermal Analysis and Calorimetry (2004), 75(3), 929-936  
CODEN: JTACF7; ISSN: 1388-6150  
PB Kluwer Academic Publishers  
DT Journal  
LA English  
AB A family of single source precursors, for the spray CVD of chalcopyrite thin films (CuInS<sub>2</sub>), was synthesized in good yields (.apprx.65%). Newly synthesized compds. include [{L}2Cu(SR)2In(SR)2] (R = alkyl, aryl; L = phosphine/arsine/stibine neutral donor ligand). The use of the single source precursors provides an attractive alternative over conventionally used multi-source precursors, which are often toxic, air sensitive and pyrophoric. However, it is desirable that these thin films be processed on flexible polymer substrates such as Kapton. Therefore, milder deposition temps. are needed to maintain the structural integrity of the underlying polymer substrates. By selective manipulation of the steric and electronic properties of the precursor, milder processing temps. may be employed, while maintaining the desired stoichiometry of the deposited films. Elucidation of the structures were confirmed using NMR. Thermal anal. techniques, DSC and TGA (TG), were employed to determine thermal profiles of each candidate compound

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 2 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2004:277396 CAPLUS  
DN 141:192917  
TI Synthesis and characterization of the first liquid single source precursors for the deposition of ternary chalcopyrite (CuInS<sub>2</sub>) thin film materials  
AU Banger, Kulbinder K.; Cowen, Jonathan; Hepp, Aloysius F.

CS Ohio Aerospace Institute, Brook Park, OH, 44142, USA  
SO NASA/TM (2002), NASA/TM-2002-211128, 1-42  
CODEN: NATMA4; ISSN: 0499-9320  
DT Report  
LA English  
OS CASREACT 141:192917  
AB Mol. engineering of ternary single source precursors based on the  $\{(\text{PBu}_3)_2\text{Cu}(\text{SR}')_2\text{In}(\text{SR}')_2\}$  architecture have afforded the 1st liquid CIS ternary single source precursors (when R = Et, Pr), which are suitable for low temperature deposition, ( $< 350^\circ\text{C}$ ). Thermogravimetric analyses (TGA) and Modulated-DSC confirm their liquid phase and reduced stability. X-ray diffraction studies, EDS and SEM support the formation of the single-phase chalcopyrite CuInS<sub>2</sub> at low temps.

RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 3 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2004:46634 CAPLUS  
DN 140:342013  
TI Chemical vapor deposition for ultra-lightweight thin-film solar arrays for space  
AU Hepp, Aloysius F.; Raffaelle, Ryne P.; Banger, Kulbinder K.; Jin, Michael H.; Lau, Janice E.; Harris, Jerry D.; Cowen, Jonathan E.; Duraj, Stan A.  
CS National Aeronautics and Space Administration, Glenn Research Center, Cleveland, OH, 44135, USA  
SO NASA/TM (2002), NASA/TM-2002-2111835, 1-6  
CODEN: NATMA4; ISSN: 0499-9320  
DT Report  
LA English  
AB The development of thin-film solar cells on flexible, lightwt., space-qualified substrates provides an attractive cost solution to fabricating solar arrays with high sp. power (W/kg). The use of a polycryst. chalcopyrite absorber layer for thin-film solar cells is considered for the next generation photovoltaic devices. This creates a need for low-cost high-throughput manufacturing of high-efficiency thin-film solar cells. New single-source-precursors (SSP's) and their use in deposition of chalcopyrite semi-conducting layers (CIS) onto flexible substrates for solar cell fabrication are discussed. The syntheses and thermal modulation of SSP's via mol. engineering is described. Thin-film fabrication studies demonstrate that the SSPs can be used in a spray CVD process for depositing CIS at reduced temps., which has good elec. properties suitable for PV devices.

RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 4 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:860654 CAPLUS  
DN 140:67846  
TI A New Facile Route for the Preparation of Single-Source Precursors for Bulk, Thin-Film, and Nanocrystallite I-III-VI Semiconductors  
AU Banger, Kulbinder K.; Jin, Michael H.-C.; Harris, Jerry D.; Fanwick, Philip E.; Hepp, Aloysius F.  
CS Ohio Aerospace Institute, Cleveland, OH, 44142, USA  
SO Inorganic Chemistry (2003), 42(24), 7713-7715  
CODEN: INOCAJ; ISSN: 0020-1669  
PB American Chemical Society  
DT Journal  
LA English  
AB The authors report a new simplified synthetic procedure for com. manufacture of ternary single-source precursors (SSPs). This new synthetic process was successfully implemented to fabricate known SSPs on bulk scale and the 1st liquid SSPs to the semiconductors CuInSe<sub>2</sub> and AgIn<sub>x</sub>S<sub>y</sub>. Single crystal x-ray

determination reveals the 1st unsolvated ternary AgInS SSP. SSPs prepared via this

new route have successfully been used in a spray assisted CVD process to deposit polycryst. thin films, and for preparing ternary nanocrystallites.

RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 5 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:822014 CAPLUS  
DN 140:50503  
TI The effect of film composition on the texture and grain size of CuInS<sub>2</sub> prepared by chemical spray pyrolysis  
AU Jin, Michael H.-C.; Banger, Kulbinder K.; Harris, Jerry D.; Hepp, Aloysius F.  
CS Ohio Aerospace Institute, Brookpark, OH, 44142, USA  
SO Materials Research Society Symposium Proceedings (2003), 763 (Compound Semiconductor Photovoltaics), 403-408  
CODEN: MRSPDH; ISSN: 0272-9172  
PB Materials Research Society  
DT Journal  
LA English  
AB Ternary single-source precursors were used to deposit CuInS<sub>2</sub> thin films using chemical spray pyrolysis. The authors studied the effect of the film composition on texture, secondary phase formation, and grain size. Films with either (112)- or (204/220)-preferred orientation were deposited with most often In-rich composition. The (112)-preferred orientation became more pronounced as the film composition became more In-poor. Films with a (204/220)-preferred orientation were both In-rich and contained a yet unidentified secondary phase. The phase was evaluated as an In-rich compound based on composition anal. and Raman spectroscopy. Further the phase could be removed by depositing a thin Cu layer prior to the growth of CuInS<sub>2</sub>. Similarly, as-grown Cu-rich (112)-oriented films did not exhibit the In-rich compound. The (204/220) preferred orientation of the film is likely related to the equivalent symmetry between planes of CuInS<sub>2</sub> and the In-rich compound. The largest grain size (.apprx. 0.5 μm) was achieved with Cu-rich (112)-oriented films.

RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 6 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:491570 CAPLUS  
DN 139:189925  
TI Nanocrystalline Chalcopyrite Materials (CuInS<sub>2</sub> and CuInSe<sub>2</sub>) via Low-Temperature Pyrolysis of Molecular Single-Source Precursors  
AU Castro, Stephanie L.; Bailey, Sheila G.; Raffaelle, Ryne P.; Banger, Kulbinder K.; Hepp, Aloysius F.  
CS Ohio Aerospace Institute, Cleveland, OH, 44142, USA  
SO Chemistry of Materials (2003), 15(16), 3142-3147  
CODEN: CMATEX; ISSN: 0897-4756  
PB American Chemical Society  
DT Journal  
LA English  
AB Nanometer-sized particles of the chalcopyrite compds. CuInS<sub>2</sub> and CuInSe<sub>2</sub> were synthesized by thermal decomposition of mol. single-source precursors (PPh<sub>3</sub>)<sub>2</sub>CuIn(SEt)<sub>4</sub> and (PPh<sub>3</sub>)<sub>2</sub>CuIn(SePh)<sub>4</sub>, resp., in the noncoordinating solvent dioctyl phthalate at 200-300°. The nanoparticles range in size from 3 to 30 nm and are aggregated to form roughly spherical clusters of .apprx.500 nm in diameter. X-ray diffraction of the nanoparticle powders shows greatly broadened lines, indicative of very small particle sizes, which is confirmed by TEM. Peaks present in the XRD can be indexed to reference patterns for the resp. chalcopyrite compds. Optical spectroscopy and elemental anal. by energy dispersive spectroscopy support the

identification of the nanoparticles as chalcopyrites.  
RE.CNT 58 THERE ARE 58 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 7 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:428255 CAPLUS  
DN 139:294436  
TI Single source precursors for fabrication of I-III-VI<sub>2</sub> thin-film solar cells via spray CVD  
AU Hollingsworth, J. A.; Banger, K. K.; Jin, M. H.-C.; Harris, J. D.; Cowen, J. E.; Bohannan, E. W.; Switzer, J. A.; Buhro, W. E.; Hepp, A. F.  
CS Department of Chemistry, Washington University, St. Louis, MO, 63130, USA  
SO Thin Solid Films (2003), 431-432, 63-67  
CODEN: THSFAP; ISSN: 0040-6090  
PB Elsevier Science B.V.  
DT Journal  
LA English  
AB The development of thin-film solar cells on flexible, lightwt., space-qualified substrates provides an attractive cost solution to fabricating solar arrays with high sp. power (W/kg). Thin-film fabrication studies demonstrate that ternary single source precursors can be used in either a hot or cold-wall spray chemical vapor deposition (CVD) reactor for depositing CuInS<sub>2</sub>, CuGaS<sub>2</sub>, and Cu(Ga,In)S<sub>2</sub> at reduced temps. (400-450°), which display good elec. and optical properties suitable for photovoltaic devices. X-ray diffraction studies, energy dispersive spectroscopy, and SEM confirmed the formation of the single-phase CuInS<sub>2</sub>, CuGaS<sub>2</sub>, and Cu(Ga,In)S<sub>2</sub> thin films on various substrates at reduced temps.

RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 8 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:383457 CAPLUS  
DN 139:309891  
TI A review of single source precursors for the deposition of ternary chalcopyrite materials  
AU Banger, K. K.; Cowen, J.; Harris, J.; McClarnon, R.; Hehemann, D. G.; Duraj, S. A.; Scheiman, D.; Hepp, A. F.  
CS Ohio Aerospace Institute, Brookpark, OH, 44142, USA  
SO NASA Conference Publication (2002), 2002-211831(17th Space Photovoltaic Research and Technology Conference, 2001), 115-125  
CODEN: NACPDX; ISSN: 0191-7811  
PB National Aeronautics and Space Administration  
DT Journal; (computer optical disk)  
LA English  
AB The development of thin-film solar cells on flexible, lightwt., space-qualified durable substrates (i.e. Kapton) provides an attractive solution to fabricating solar arrays with high sp. power. The syntheses and thermal modulation of ternary single source precursors, based on the [{LR}2Cu(SR')<sub>2</sub>In(SR')<sub>2</sub>]-architecture, in good yields, are described. TGA and low-temperature DSC demonstrate that controlled manipulation of the steric and electronic properties of either the group 5-donor and/or chalcogenide moiety permits directed adjustment of the thermal stability and phys. properties of the precursors. TGA-Evolved Gas Anal., confirms that single precursors decompose by the initial expulsion of the sulfide moiety, followed by the loss of the neutral donor group, (L) to release the ternary chalcopyrite matrix. XRD studies, EDS and SEM of the nonvolatile pyrolyzed material demonstrate that these derivs. produce single-phase CuInS<sub>2</sub>/CuInSe<sub>2</sub> materials at low temperature. Thin-film fabrication studies demonstrate that these single source precursors can be used in a spray CVD process to deposit CuInS<sub>2</sub> onto flexible polymer substrates at temps. <400°.

RE.CNT 31 THERE ARE 31 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 9 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:383454 CAPLUS  
DN 139:152228  
TI Atmospheric pressure spray chemical vapor deposited CuInS<sub>2</sub> thin films for photovoltaic applications  
AU Harris, J. D.; Raffaelle, R. P.; Banger, K. K.; Smith, M. A.; Scheiman, D. A.; Hepp, A. F.  
CS Cleveland State University, Cleveland, OH, 44115, USA  
SO NASA Conference Publication (2002), 2002-211831(17th Space Photovoltaic Research and Technology Conference, 2001), 84-90  
CODEN: NACPDX; ISSN: 0191-7811  
PB National Aeronautics and Space Administration  
DT Journal; (computer optical disk)  
LA English  
AB Solar cells have been prepared using atmospheric pressure spray chemical vapor deposited CuInS<sub>2</sub> absorbers. The CuInS<sub>2</sub> films were deposited at 390° using single source precursor (PPh<sub>3</sub>)<sub>2</sub>CuIn(SEt)<sub>4</sub> in an argon atmospheric. The absorber ranges in thickness from 0.75 to 1.0 μm, and exhibits a crystallog. gradient, with the leading edge having a (220) preferred orientation and the trailing edge having a (112) orientation. Schottky diodes prepared by thermal evaporation of aluminum contacts on to the CuInS<sub>2</sub> yielded diodes for films that were annealed at 600°. Solar cells were prepared using annealed films and had the (top-to-down) composition  
of Al/ZnO/CdS/CuInS<sub>2</sub>/Mo/glass. The short-circuit current, open-circuit voltage, fill factor, and efficiency were 6.46 mA/cm<sup>2</sup>, 307 mV, 24%, and 0.35%, resp., for the best small area cells under simulated air-mass 0 illumination.

RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 10 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:365416 CAPLUS  
DN 139:94254  
TI Novel Bimetallic Thiocarboxylate Compounds as Single-Source Precursors to Binary and Ternary Metal Sulfide Materials  
AU Deivaraj, Theivanayagam C.; Park, Jin-Ho; Afzaal, Mohammad; O'Brien, Paul; Vittal, Jagadese J.  
CS Department of Chemistry, National University of Singapore, Singapore, 117543, Singapore  
SO Chemistry of Materials (2003), 15(12), 2383-2391  
CODEN: CMATEX; ISSN: 0897-4756  
PB American Chemical Society  
DT Journal  
LA English  
OS CASREACT 139:94254  
AB Binuclear [(Ph<sub>3</sub>P)CuM(SC(O)Ph)<sub>4</sub>] (M = Ga (1) or In (2)), [(Ph<sub>3</sub>P)<sub>2</sub>AgGa(SC(O)Ph)<sub>4</sub>] (3), [(Ph<sub>3</sub>P)<sub>2</sub>AgIn(SC(O)R)<sub>4</sub>] (R = Me (4) or Ph (5)) were synthesized and characterized. The solid-state structures of compds. 1-3 were determined by x-ray crystallog. TG and pyrolysis studies revealed that these compds. decompose to give the corresponding ternary metal sulfide materials. However, using the aerosol-assisted CVD (AACVD) method, In<sub>2</sub>S<sub>3</sub> thin films were obtained from 2 and AgIn<sub>5</sub>S<sub>8</sub> thin films were obtained from compds. 4 and 5.

RE.CNT 47 THERE ARE 47 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 11 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:315506 CAPLUS

DN 139:119828  
TI Characterization of CuInS<sub>2</sub> films prepared by atmospheric pressure spray chemical vapor deposition  
AU Harris, Jerry D.; Banger, Kulbinder K.; Scheiman, David A.; Smith, Mark A.; Jin, Michael H.-C.; Hepp, Aloysius F.  
CS Department of Chemistry, Cleveland State University, Cleveland, OH, 44115, USA  
SO Materials Science & Engineering, B: Solid-State Materials for Advanced Technology (2003), B98(2), 150-155  
CODEN: MSBTEK; ISSN: 0921-5107  
PB Elsevier Science B.V.  
DT Journal  
LA English  
AB CuInS<sub>2</sub> films were deposited by atmospheric pressure spray CVD. Films were deposited at 390° using [(PPh<sub>3</sub>)<sub>2</sub>CuIn(SEt)<sub>4</sub>] as a single source precursor in an Ar atmospheric. The films range in thickness from 0.75 to 1.0 μm and exhibit a crystallog. gradient, with the leading edge having a (220) preferred orientation and the trailing edge having a (112) orientation. Schottky diodes prepared by thermal evaporation of Al contacts onto the CuInS<sub>2</sub> yielded diodes for films that were annealed at 600°. The photoresponse of several films was measured by photoelectrochem. anal. in an aqueous, acidic electrolyte. Prolonged exposure of the films to the electrolyte decreased the photoresponse. Complete solar cells were prepared using annealed films with a (top down) composition of Al/ZnO/CdS/CuInS<sub>2</sub>/Mo/Glass. The values for the short-circuit current, open-circuit voltage, maximum power output (Pmax), current at Pmax (I<sub>max</sub>), voltage at Pmax (V<sub>max</sub>), fill factor and efficiency were 5.25 mA, 304 mV, 0.470 mW, 2.92 mA, 161 mV, 29.4 and 0.68%, resp., for a 0.5 cm<sup>2</sup> cell under simulated AM0 illumination.

RE.CNT 30 THERE ARE 30 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 12 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2003:243913 CAPLUS  
DN 139:94219  
TI Synthesis, characterization, and spectroscopic properties of heterobimetallic isopropoxides of Co, Ni and Cu containing diethanolamine moiety  
AU Sharma, Kanupriya; Sharma, Malti; Singh, Anirudh; Mehrotra, Ram C.  
CS Department of Chemistry, University of Rajasthan, Jaipur, 302 004, India  
SO Indian Journal of Chemistry, Section A: Inorganic, Bio-inorganic, Physical, Theoretical & Analytical Chemistry (2003), 42A(3), 493-498  
CODEN: ICACEC; ISSN: 0376-4710  
PB National Institute of Science Communication  
DT Journal  
LA English  
OS CASREACT 139:94219  
AB Hydrocarbon-insol. derivs. M(deaH)<sub>2</sub> (M = Co, Ni, Cu; deaH<sub>2</sub> = diethanolamine) on reactions with Al(OPri)<sub>3</sub> in 1:2 molar ratio yield hydrocarbon-soluble, monomeric heterobimetallic derivs. [{Al(OPri)<sub>2</sub>}<sub>2</sub>M(dea)<sub>2</sub>]. A different type of soluble heteroleptic derivs. was prepared by the reactions of M{Al(OPri)<sub>4</sub>}<sub>2</sub> with deaH<sub>2</sub> in 1:1, 1:2 and 1:3 molar ratios. The reaction of M{Al(OPri)<sub>4</sub>}<sub>2</sub> with four equivalent of diethanolamine yields a benzene insol. product M{Al(dea)<sub>2</sub>}<sub>2</sub>. All these new derivs. were characterized by elemental analyses, mol. weight measurements and spectroscopic (Electronic and IR) studies.

RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 13 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2002:974910 CAPLUS

DN 138:306675  
TI Single-source approach for the growth of I-III-VI thin films  
AU Afzaal, Mohammad; Deivaraj, Theivanayagam C.; O'Brien, Paul; Park, Jin-Ho;  
Vittal, Jagadese J.  
CS The Manchester Materials Science Centre and Department of Chemistry,  
University of Manchester, Manchester, M13 9PL, UK  
SO Materials Research Society Symposium Proceedings (2002), 730 (Materials for  
Energy Storage, Generation and Transport), 185-190  
CODEN: MRSPDH; ISSN: 0272-9172  
PB Materials Research Society  
DT Journal  
LA English  
AB The ternary chalcopyrite semiconductors, I-III-VI, are currently used for  
photovoltaic solar cell applications. AgInS<sub>8</sub> thin films were prepared from  
single-source bimetalorg. precursors [e.g. (PPh<sub>3</sub>)<sub>2</sub>AgIn(SC{O}R)4, R =  
alkyl] by aerosol assisted CVD (AA-CVD). These compds. can be used as  
single-source precursors for the deposition of the ternary chalcopyrite  
semiconductors by one-pot reactions using the AA-CVD process. In addition,  
these compds. are air stable, which is favorable in comparison with metal  
alkyl compds. which are pyrophoric. The optimum growth temperature for the  
preparation of these films on glass and on Si(100) substrates is >350°  
in terms of crystallinity, although deposition occurred at low temps. The  
films were studied using XRD, SEM and EDS. SEM anal. shows that all films  
are microcryst. but have different morphologies depending on the growth  
temps. XRD results show evidence of the crystalline nature of these films.  
Results are presented and discussed.

RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 14 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2002:378096 CAPLUS  
DN 137:102977  
TI Extending the Coordination Chemistry of Molecular P<sub>4</sub>S<sub>3</sub>: The Polymeric  
Ag(P<sub>4</sub>S<sub>3</sub>)<sup>+</sup> and Ag(P<sub>4</sub>S<sub>3</sub>)<sup>2+</sup> Cations  
AU Adolf, Ariane; Gonsior, Marcin; Krossing, Ingo  
CS Institut fuer Anorganische Chemie, Universitaet Karlsruhe, Karlsruhe,  
D-76128, Germany  
SO Journal of the American Chemical Society (2002), 124(24), 7111-7116  
CODEN: JACSAT; ISSN: 0002-7863  
PB American Chemical Society  
DT Journal  
LA English  
AB Upon reacting P<sub>4</sub>S<sub>3</sub> with AgAl(hfip)<sub>4</sub> and AgAl(pftb)<sub>4</sub> [hfip = OC(H)(CF<sub>3</sub>)<sub>2</sub>;  
pftb = OC(CF<sub>3</sub>)<sub>3</sub>], the compds. Ag(P<sub>4</sub>S<sub>3</sub>)Al(hfip)<sub>4</sub> (1) and  
Ag(P<sub>4</sub>S<sub>3</sub>)<sup>2+</sup>[Al(pftb)<sub>4</sub>]<sup>-</sup> (2) formed in CS<sub>2</sub> or CS<sub>2</sub>/CH<sub>2</sub>C<sub>12</sub> solution, resp.  
Compds. 1 and 2 were characterized by single-crystal x-ray structure  
detns., Raman and solution NMR spectroscopy, and elemental analyses.  
One-dimensional chains of [Ag(P<sub>4</sub>S<sub>3</sub>)x]<sup>∞</sup> (x = 1 (1); x = 2 (2)) formed  
in the solid state with P<sub>4</sub>S<sub>3</sub> ligands that bridge through a 1,3-P,S, a  
2,4-P,S, or a 3,4-P,P η<sub>1</sub> coordination to the silver ions. Compound 2  
with the least basic anion contains the 1st homoleptic metal(P<sub>4</sub>S<sub>3</sub>)  
complex. Compds. 1 and 2 also include the long sought sulfur coordination  
of P<sub>4</sub>S<sub>3</sub>. Raman spectra of 1 and 2 were assigned from DFT calcns. of  
related species. The influence of the silver coordination on the geometry  
of the P<sub>4</sub>S<sub>3</sub> cage is discussed, addnl. aided by DFT calcns. Consequences  
for the frequently observed degradation of the cage are suggested. An exptl.  
silver ion affinity scale based on the solid-state structures of several  
weak Lewis acid base adducts (L)AgAl(hfip)<sub>4</sub> is given. The affinity of the  
ligand L to the silver ion increases according to P<sub>4</sub> < CH<sub>2</sub>C<sub>12</sub> < P<sub>4</sub>S<sub>3</sub> < S<sub>8</sub>  
< 1,2-C<sub>2</sub>H<sub>4</sub>C<sub>12</sub> < toluene.

RE.CNT 59 THERE ARE 59 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 15 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2002:140318 CAPLUS  
DN 136:349702  
TI Superweak complexes of tetrahedral P4 molecules with the silver cation of weakly coordinating anions  
AU Krossing, Ingo; Van Wullen, Leo  
CS Institut fur Anorganische Chemie, Universitat Karlsruhe, Karlsruhe, 76128, Germany  
SO Chemistry--A European Journal (2002), 8(3), 700-711  
CODEN: CEUJED; ISSN: 0947-6539  
PB Wiley-VCH Verlag GmbH  
DT Journal  
LA English  
OS CASREACT 136:349702  
AB The silver aluminates  $\text{AgAl}[\text{OC}(\text{CF}_3)_2(\text{R})]_4$  ( $\text{R} = \text{H}, \text{CH}_3, \text{CF}_3$ ) react with solns. of white phosphorus P4 to give complexes that bind one or two almost undistorted tetrahedral P4 mols. in an  $\eta^2$  fashion:  $[\text{Ag}(\text{P}_4)_2]+[\text{Al}(\text{OC}(\text{CF}_3)_3)_4]-$  (1) containing the 1st homoleptic metal-phosphorus cation, the mol. species  $(\text{P}_4)\text{AgAl}[\text{OCMe}(\text{CF}_3)_2]_4$  (2), and the dimeric  $\text{Ag}(\mu, \eta^2-\text{P}_4)\text{Ag}$  bridged  $\{(\text{P}_4)\text{AgAl}[\text{OC}(\text{H})(\text{CF}_3)_2]_4\}_2$  (3). Compds. 1-3 were characterized by variable-temperature (VT)  $^{31}\text{P}$  NMR spectroscopy (1 also by VT  $^{31}\text{P}$  MAS NMR spectroscopy), Raman spectroscopy, and single-crystal x-ray crystallog. Other Ag:P4 ratios did not lead to new species, and this observation was rationalized on thermodyn. grounds. The  $\text{Ag}(\text{P}_4)_2^+$  ion has an almost planar coordination environment around the  $\text{Ag}^+$  ion due to  $\text{dx}^2-\text{y}^2(\text{Ag}) \rightarrow \sigma^*(\text{P}-\text{P})$  backbonding. Calcn. (HF-DFT) on six  $\text{Ag}(\text{P}_4)_2^+$  isomers showed that the planar  $\eta^2$  form is only slightly favored by 5.2 kJ mol<sup>-1</sup> over the tetrahedral  $\eta^2$  species;  $\eta^1-\text{P}_4$  and  $\eta^3-\text{P}_4$  complexes are less favorable (27-76 kJ mol<sup>-1</sup>). The bonding of the P4 moiety in  $[\text{RhCl}(\eta^2-\text{P}_4)(\text{PPh}_3)_2]$ , the only compound in which an  $\eta^2$  bonding mode of a tetrahedral P4 mol. was claimed, must be regarded as a tetraphosphabicyclobutane, and not as a tetrahedro-P4 complex, from the published NMR and vibrational spectra, the calculated geometry of  $[\text{RhCl}(\text{P}_4)(\text{PH}_3)_2]$  (10), the highly endothermic (385 kJ mol<sup>-1</sup>) calculated dissociation enthalpy of 10 into P4 and  $\text{RhCl}(\text{PH}_3)_2$  (11), as well as atoms in mols. (AIM) and natural bond orbital (NBO) population analyses of 10 and the  $\text{Ag}(\text{P}_4)_2^+$  ion. Therefore, 1-3 are the 1st examples of species containing  $\eta^2$ -coordinated tetrahedral P4 mols.

RE.CNT 46 THERE ARE 46 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 16 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2002:81783 CAPLUS  
DN 137:65628  
TI Facile modulation of single source precursors: the synthesis and characterization of single source precursors for deposition of ternary chalcopyrite materials  
AU Banger, K. K.; Harris, J. D.; Cowen, J. E.; Hepp, A. F.  
CS Thin Film Technology Group, NASA Glenn Research Center, Cleveland, OH, 44135, USA  
SO Thin Solid Films (2002), 403-404, 390-395  
CODEN: THSFAP; ISSN: 0040-6090  
PB Elsevier Science S.A.  
DT Journal  
LA English  
AB The syntheses and controlled thermal decomposition of ternary single-source-precursors for preparation of copper indium disulfide ( $\text{CuInS}_2$ ) thin films was studied, using precursors of structure  $(\text{ER}_3)_2\text{Cu}(\text{YR}')_2\text{In}(\text{YR}')_2$  (I; E = P, As, Sb; Y = S, Se; and R = alkyl, aryl). Good yields of thin-film  $\text{CuInS}_2$  were obtained for I ( $\text{R} = \text{Bu}$ ,  $\text{Y} = \text{S}$ ; and  $\text{R}' = \text{Et}$  or  $\text{Pr}$ ) on flexible polymeric substrates at  $<400^\circ$ . These new

compds. were decomposed by spray chemical vapor deposition to CuInS<sub>2</sub>, an absorber layer for the fabrication of thin-film solar cells. Thermogravimetric analyses (TGA) and differential scanning calorimetry demonstrated that controlled manipulation of the steric and electronic properties of either the Group V donor and/or chalcogenide moiety resulted in a directed adjustment of the thermal stability and phys. properties of the precursor. Preliminary studies showed that these compds. produced single-phase CuInS<sub>2</sub> thin films at low temperature, which was confirmed by x-ray diffraction, energy dispersive spectrometry, and SEM.

RE.CNT 12 THERE ARE 12 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 17 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2001:826008 CAPLUS  
DN 136:193190  
TI Single-source precursors to ternary silver indium sulfide materials  
AU Deivaraj, Theivanayagam C.; Park, Jin-Ho; Afzaal, Mohammmd; O'Brien, Paul; Vittal, Jagadese J.  
CS Department of Chemistry, National University of, Singapore  
SO Chemical Communications (Cambridge, United Kingdom) (2001), (22), 2304-2305  
CODEN: CHCOFS; ISSN: 1359-7345  
PB Royal Society of Chemistry  
DT Journal  
LA English  
OS CASREACT 136:193190  
AB [(Ph<sub>3</sub>P)<sub>2</sub>AgIn(SC(O)R)<sub>4</sub>] (R = Me, Ph) were prepared, characterized,, and used as excellent single-source precursors for AgInS<sub>2</sub> bulk materials by pyrolysis and AgInS<sub>8</sub> films by aerosol assisted CVD (AACVD). Crystals of the chloroform solvate of the Ph complex are triclinic, space group P.hivin.1, with a 12.7284(5), b 14.3145(6), c 18.7071(7) Å, α 90.716(1), β 99.624(1), γ 110.728(1)°; Z = 2, dc = 1.500; R = 0.0486, R<sub>w</sub> = 0.0802.

RE.CNT 15 THERE ARE 15 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 18 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2001:792600 CAPLUS  
DN 136:95012  
TI Synthesis and Characterization of the First Liquid Single-Source Precursors for the Deposition of Ternary Chalcopyrite (CuInS<sub>2</sub>) Thin Film Materials  
AU Banger, Kulbinder K.; Cowen, Jonathan; Hepp, Aloysius F.  
CS Ohio Aerospace Institute, Cleveland, OH, 44142, USA  
SO Chemistry of Materials (2001), 13(11), 3827-3829  
CODEN: CMATEX; ISSN: 0887-4756  
PB American Chemical Society  
DT Journal  
LA English  
OS CASREACT 136:95012  
AB Mol. engineering of ternary single-source precursors based on the [(PBu<sub>3</sub>)<sub>2</sub>Cu(SR)<sub>2</sub>In(SR)<sub>2</sub>] architecture have afforded the first liquid CIS ternary single-source precursors (when R = Et, n-Pr), which are suitable for low-temperature deposition (<350°). Thermogravimetric analyses (TGA) and modulated DSC confirm their liquid phase and reduced stability. X-ray diffraction studies, EDS, and SEM support the formation of the single-phase chalcopyrite CuInS<sub>2</sub> at low temps.

RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 19 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 2001:381747 CAPLUS

DN 135:155059  
TI Using single source precursors and spray chemical vapor deposition to grow thin-film CuInS<sub>2</sub>  
AU Harris, Jerry D.; Hehemann, David G.; Cowen, Jonathan E.; Hepp, Aloysius F.; Raffaelle, Ryne P.; Hollingsworth, Jennifer A.  
CS School of Technology, Kent State University, Kent, OH, 44242, USA  
SO Conference Record of the IEEE Photovoltaic Specialists Conference (2000), 28th, 563-566  
CODEN: CRCNDP; ISSN: 0160-8371  
PB Institute of Electrical and Electronics Engineers  
DT Journal  
LA English  
AB Thin films of CuInS<sub>2</sub> were deposited on fused silica, stainless steel, Kapton and polybenzobisoxazole using the single source organometallic precursor (PPh<sub>3</sub>)<sub>2</sub>CuIn(SEt)<sub>4</sub>, in conjunction with spray chemical vapor deposition. Films were deposited at temps. ranging from 325 - 360°C. As deposited, the films had a thickness on the order of 200 Å. The grain structure of the films was found to vary with carrier gas flow rate and substrate temperature  
RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 20 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 1999:407704 CAPLUS  
DN 131:80925  
TI Spray CVD of copper indium disulfide films. Control of microstructure and crystallographic orientation  
AU Hollingsworth, Jennifer A.; Hepp, Aloysius F.; Buhro, William E.  
CS Dep. Chem., Washington Univ., St. Louis, MO, 63130, USA  
SO Chemical Vapor Deposition (1999), 5(3), 105-108 Published in: Adv. Mater. (Weinheim, Ger.), 11(8)  
CODEN: CVDFX; ISSN: 0948-1907  
PB Wiley-VCH Verlag GmbH  
DT Journal  
LA English  
AB The deposition of dense crystalline CuInS<sub>2</sub> films by spray CVD from a single source precursor was investigated. Toluene solns. of the precursor (Ph<sub>3</sub>P)<sub>2</sub>-Cu(μ-SEt<sub>2</sub>)In(SEt)<sub>2</sub> were employed and depositions were conducted using a warm-zone temperature of 140 ± 10° at substrate temps. of 405 ± 5° with Ar carrier-gas flow rates of 2.7-5.3 L/min. Wavelength-dispersive x-ray spectroscopy showed that the films were nearly stoichiometric CuInS<sub>2</sub>. X-ray diffraction pattern confirmed the crystalline state of the CuInS<sub>2</sub> films. Film microstructure and orientations were studied in function of the deposition parameters such as substrate (fused SiO<sub>2</sub>, Si(100) substrate, or In<sub>2</sub>O<sub>3</sub> buffer layers) and carrier gas flow rate. Films deposited on fused SiO<sub>2</sub> or Si(100) substrates exhibited the uncommon [220] orientation whereby the degree of orientation depended on the carrier-gas flow rate. Films deposited on In<sub>2</sub>O<sub>3</sub> buffer layers were highly [112]-oriented. Carrier-gas flow significantly influenced the film microstructure. Films deposited at the lowest flow rate exhibited dendritic microstructures and were visually rough and black, whereas films deposited at the highest flow rates were visually the most uniform and reflective, and were blue with a microstructure consisting of non-faceted, elongated grains. Films deposited at intermediate flow rate exhibited dense, columnar growth and faceted crystalline features.

RE.CNT 20 THERE ARE 20 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 21 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 1998:536748 CAPLUS  
DN 129:252601  
TI Spray chemical vapor deposition of CuInS<sub>2</sub> thin films for application in

solar cell devices  
AU Hollingsworth, Jennifer A.; Buhro, William E.; Hepp, Aloysius F.; Jenkins, Philip P.; Stan, Mark A.  
CS Dept. of Chemistry, Washington University, St. Louis, MO, 63130, USA  
SO Materials Research Society Symposium Proceedings (1998), 495(Chemical Aspects of Electronic Ceramics Processing), 171-176  
CODEN: MRSPDH; ISSN: 0272-9172  
PB Materials Research Society  
DT Journal  
LA English  
AB Chalcopyrite CuInS<sub>2</sub> is a direct band gap semiconductor (1.5 eV) that has potential applications in photovoltaic thin film and photoelectrochem. devices. The authors have successfully employed spray CVD using the previously known, single-source, metalorg. precursor, (Ph<sub>3</sub>P)<sub>2</sub>CuIn(SEt)<sub>4</sub>, to deposit CuInS<sub>2</sub> thin films. Stoichiometric, polycryst. films were deposited onto fused SiO<sub>2</sub> over a range of temps. (300-400°). Morphol. was observed to vary with temperature: spheroidal features were obtained at lower temps. and angular features at 400°. At even higher temps. (500°), a Cu-deficient phase, CuIn<sub>5</sub>S<sub>8</sub>, was obtained as a single phase. The CuInS<sub>2</sub> films have a direct band gap of .apprx.1.4 eV.  
RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD  
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L4 ANSWER 22 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 1993:159854 CAPLUS  
DN 118:159854  
TI Synthesis of mixed copper-indium chalcogenolates. Single-source precursors for the photovoltaic materials CuInQ<sub>2</sub> (Q = S, Se)  
AU Hirpo, Wakgari; Dhingra, Sandeep; Sutorik, Anthony C.; Kanatzidis, Mercouri G.  
CS Dep. Chem., Michigan State Univ., East Lansing, MI, 48824, USA  
SO Journal of the American Chemical Society (1993), 115(4), 1597-9  
CODEN: JACSAT; ISSN: 0002-7863  
DT Journal  
LA English  
AB The mol. precursor compds. (Ph<sub>3</sub>P)<sub>2</sub>CuIn(QR)<sub>4</sub> (1; Q = S, R = Et; Q = Se, R = Et; Q = S, R = isobutyl) for the ternary semiconductor photovoltaic materials CuInQ<sub>2</sub> (Q = S, Se) were prepared. Mol. structures of 1 show heterobimetallic compds. with 2 thiolates/selenolates bridging Cu and In atoms forming a CuIn(QR)<sub>2</sub> core. The tetrahedral Cu and In coordination spheres are completed by terminal R<sub>3</sub>P and QR- ligands, resp. Crystal data for 1: space group C2/c, R/Rw = 0.037/0.043; P.hivin.1, R/Rw = 0.038/0.031; P.hivin.1, R = 0.12, resp. Vacuum thermolysis of (Ph<sub>3</sub>P)<sub>2</sub>CuIn(QR)<sub>4</sub> at 400° gives single phase crystalline CuInQ<sub>2</sub>.

L4 ANSWER 23 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 1991:74060 CAPLUS  
DN 114:74060  
TI Synthesis, reactions and characterization of bi- and ter-metallic alkoxides of copper(II) with aluminum(III), zirconium(IV), niobium(V) and tantalum(V)  
AU Chhipa, R. C.; Singh, A.; Mehrotra, R. C.  
CS Dep. Chem., Univ. Rajasthan, Jaipur, 302004, India  
SO Synthesis and Reactivity in Inorganic and Metal-Organic Chemistry (1990), 20(8), 989-99  
CODEN: SRIMCN; ISSN: 0094-5714  
DT Journal  
LA English  
AB [(Me<sub>3</sub>CO)<sub>4</sub>Al]Cu[M(OCHMe<sub>2</sub>)<sub>x</sub>] (M = Al, x = 4; M = Nb or Ta, x = 6), [(Me<sub>3</sub>O)<sub>4</sub>Al]Cu[Zr<sub>2</sub>(OCHMe<sub>2</sub>)<sub>9</sub>], [(Me<sub>2</sub>CHO)<sub>4</sub>Al]Cu[Ta(OCHMe<sub>2</sub>)<sub>6</sub>] (I) and [(Me<sub>2</sub>CHO)<sub>6</sub>Nb]Cu[Ta(OCHMe<sub>2</sub>)<sub>6</sub>] (II) were synthesized by the equimolar

interaction of the appropriate chlorobimetallic alkoxide of Cu(II) with a suitable potassium alkoxometallate. Methanolysis of II produced  $[(MeO)_6Nb]Cu[Ta(OMe)_6]$ . The alcoholysis reactions of I with PrOH, MeOH, or Me<sub>3</sub>COH gave rise to  $[(RO)_4Al]Cu[Ta(OR)_6]$  (R = Pr, Me),  $[AlCuTa(OMe)_6(OCHMe_2)_4]$ , or  $[(Me_3CO)_3(Me_2CHO)Al]Cu[Ta(OCHMe_2)_2(OCMe_3)_4]$ . All these new derivs. were characterized by elemental analyses, IR, electronic spectral studies, and mol. weight as well as magnetic susceptibility measurements.

- L4 ANSWER 24 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 1990:110706 CAPLUS  
DN 112:110706  
TI New chloro, alkoxo and allied bimetallic derivatives of copper(II) and aluminum(III)  
AU Chhipa, R. C.; Singh, A.; Mehrotra, R. C.  
CS Dep. Chem., Univ. Rajasthan, Jaipur, 302 004, India  
SO Indian Journal of Chemistry, Section A: Inorganic, Physical, Theoretical & Analytical (1989), 28A(5), 396-9  
CODEN: IJCADU; ISSN: 0376-4710  
DT Journal  
LA English  
AB  $ClCu\{Al(OCHMe_2)_4\}$  was prepared by the interaction of  $CuCl_2$  and  $K\{Al(OCHMe_2)_4\}$  in equimolar proportions.  $((Me_2CHO)Cu\{Al(CHMe_2)_4\})$  (I) was prepared by the reaction of  $CuCl_2$ , KOCHMe<sub>2</sub> and  $K\{Al(OCHMe_2)_4\}$  in 1:1:1 molar ratio. The interaction of chloro bimetallic alkoxides with KOR gives  $(RO)Cu\{Al(OCHMe_2)_4\}$ . I undergoes alc. interchange reactions, the facile nature of which is governed by the length and branching of the hydrocarbon chains of alcs. e.g. MeOH, EtOH, PrOH, sec-BuOH, tert-BuOH. The reaction with iso-BuOH gives only the mixed bimetallic alkoxides. The products were characterized by elemental analyses, mol. wts., IR, electronic spectral and magnetic susceptibility measurements.
- L4 ANSWER 25 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 1988:230854 CAPLUS  
DN 108:230854  
TI Chloride and alkoxide alkoxometallates and termetallic isopropoxides of copper(II)  
AU Dubey, Raj K.; Singh, Anirudh; Mehrotra, Ram C.  
CS Dep. Chem., Univ. Rajasthan, Jaipur, 302004, India  
SO Journal of Organometallic Chemistry (1988), 341(1-3), 569-74  
CODEN: JORCAI; ISSN: 0022-328X  
DT Journal  
LA English  
AB  $[CuClL]$  [ $L = Zr_2(OCHMe_2)_9$ ,  $Ta(OCHMe_2)_6$ ] were prepared and characterized by IR spectra, and are key precursors in the preparation of  $[CuLL_1]$  [ $HL_1 = MeOH$ ,  $Me_2CHOH$ , BuOH, EtMeCHOH, Me<sub>3</sub>COH] and  $[CuL\{Zr_2(OCHMe_2)_9\}]$  [ $HL = Hal(OCHMe_2)_4$ ,  $HGa(OCHMe_2)_4$ ,  $HTa(OCHMe_2)_6$ ].
- L4 ANSWER 26 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 1981:609778 CAPLUS  
DN 95:209778  
TI Electronic structure of simple and bimetallic alkoxides of later '3d' transition elements  
AU Mehrotra, R. C.  
CS Chem. Lab., Univ. Rajasthan, Jaipur, India  
SO Coordination Chemistry (1981), Volume Date 1980, 21, 113-25  
CODEN: CCHEDK; ISSN: 0069-9845  
DT Journal  
LA English  
AB The alkoxy group (-OR) functions as a bridging ligand between similar and different metal atoms giving rise to coordination oligomers and bimetallic alkoxides. The syntheses of a large number of simple alkoxides of Cr(III) &

IV), Mn(II), Fe(II & III), Co(II), Ni(II) and Cu(II) were described. Most of these are non-volatile and insol. in organic solvents, except (t-BuO)<sub>4</sub>C and alkoxides or Fe(III), Fe(OR)<sub>3</sub>, in general. These polymeric new alkoxides of later '3d' metals differ from the alkoxides of earlier transition and main group elements in the comparatively much lesser lability of their alkoxy groups in general. The sharp differences in the alcoholysis reactions of these alkoxides with ramification of the alkyl group were correlated with the changes in the stereochem. of the alkoxide derivs. as revealed by physico-chemical studies. A large number of monomeric volatile bimetallic isopropoxides of the above elements with Al, having the general formula M[Al(Oi-Pr)<sub>4</sub>]<sub>n</sub> were described for the 1st time. Structures of all these derivs. were suggested on the basis of spectroscopic (visible, UV, IR and ESR) and magneto-chemical studies, with tetraalkoxy aluminate moieties functioning as univalent bidentate and in some cases as tridentate ligands.

L4 ANSWER 27 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 1979:412926 CAPLUS  
DN 91:12926  
TI Volatile double isopropoxides of later transition metals with aluminum  
AU Singh, J. V.; Jain, N. C.; Mehrotra, R. C.  
CS Chem. Lab., Univ. Delhi, Delhi, 110007, India  
SO Synthesis and Reactivity in Inorganic and Metal-Organic Chemistry (1979),  
9(1), 79-88  
CODEN: SRIMCN; ISSN: 0094-5714  
DT Journal  
LA English  
AB The liquid monomeric complexes M[Al(OPr-iso)<sub>4</sub>]<sub>n</sub> (M = Cr, Fe, n = 3; M = Co, Cu, Mn, Ni, n = 2) were prepared and characterized by chemical anal., mol.-weight detns., solubility in organic solvents, and IR spectra. The [Al(OPr-iso)<sub>4</sub>]<sup>-</sup> ion acts as a bidentate ligand in these complexes.

L4 ANSWER 28 OF 28 CAPLUS COPYRIGHT 2004 ACS on STN  
AN 1979:161457 CAPLUS  
DN 90:161457  
TI Ligand field spectroscopic studies of transition metal-aluminum tetraalkoxides  
AU Stumpf, Eberhard; Hillebrand, Uwe  
CS Anorg.-Chem. Inst., Tech. Univ. Clausthal, Clausthal-Zellerfeld, Fed. Rep. Ger.  
SO Zeitschrift fuer Naturforschung, Teil B: Anorganische Chemie, Organische Chemie (1979), 34B(2), 262-5  
CODEN: ZNBAD2; ISSN: 0340-5087  
DT Journal  
LA German  
AB The preparation and electronic spectral properties of M[Al(OR)<sub>4</sub>]<sub>2</sub> (M = Co, Ni, Cu; R = Me, Et, Pr, Bu) are described. The spectral data are used in conjunction with ligand-field theory in deducing the structures of the compds. The spectrum of green Ni[Al(OR)<sub>4</sub>]<sub>2</sub> is interpreted as a Ni(OR)<sub>6</sub> octahedron sharing faces with 2 Al(OR)<sub>4</sub> tetrahedrons. Co<sup>2+</sup> and Cu<sup>2+</sup> are in a distorted octahedral coordination. The alkoxide ligands are fitted into the spectrochem. and the nephelauxetic series. They are close to H<sub>2</sub>O in these series.